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Coordination, Collaboration Key in Effective Earthquake, Tsunami Disaster Relief

Manhattan, Kan. - As humanitarian aid and disaster recovery efforts get underway following a devastating 9.0 magnitude off-shore earthquake in Japan and consequent tsunamis affecting numerous Asia-Pacific nations, effective supply chain management will be essential for disaster relief, according to a Kansas State University assistant professor whose research focuses on improving logistics for humanitarian response and public health efforts.

“Every supply chain faces challenges in delivering the right quantity and type of product to the right place at the right time,” said Jessica Heier Stamm, a faculty member with K-State’s Industrial and Manufacturing Systems Engineering (IMSE) department. “However, designing and managing systems to deliver aid to those affected by natural disasters is especially difficult given additional challenges such as damaged infrastructure and constantly changing conditions.”

One such factor that is frequently overlooked but has a significant impact is the influence of multiple and decentralized decision makers, according to Heier Stamm.

“There are often a wide range of entities involved in these supply chains, including government, military, private, and non-governmental organizations and individuals,” she explained. “While they all share a common goal – to help those affected by the disaster – each party operates based on their own objectives and levels of information, which often leads to duplication of efforts, waste, and in the worst cases aid not reaching those who need it most.”

“Traditional optimization approaches would advocate the adoption of a centralized decision maker to coordinate the entire response,” Heier Stamm continued. “But in disaster scenarios this is frequently impractical or impossible. Through my research I am identifying methods and novel approaches that enable decentralized systems to approximate the performance of centralized systems.”

Heier Stamm saw first-hand the positive effect of disaster relief supply chain coordination and collaboration on a visit to Haiti in May 2010. She and a group from Georgia Tech studied the practices of The Salvation Army, which had taken on management responsibilities for a camp for displaced persons. Through a unique collaboration with UPS, camp personnel were able to better manage data and supply distribution using the shipping giant’s Trackpad® handheld scanner system.

“Until their collaboration with UPS, The Salvation Army was using a paper system to register the 4,000 families in the camp and track distributions,” Heier Stamm said. “Using the Trackpad® system, not only were data management and supply distribution greatly improved in the camp, but the agency was also better able to coordinate with partner agencies leading to improved conditions for camp residents.”
According to Heier Stamm, the opportunities to expand the use and impact of technologies like the Trackpad® in the humanitarian relief context are many and extend beyond camp management. However, important questions about implementation remain, including the best ways to allocate the costs and benefits of an electronic system to encourage broad adoption among humanitarian responders. Designing such systems often involves finding ways to model and solve difficult optimization problems, which is where research plays a key role in improving response efforts.

“Every disaster response is unique, but it will be interesting to follow the events of the coming days and weeks to see how lessons learned in previous disasters are applied to this current international effort,” Heier Stamm said.

“As response to these types of disasters becomes more global, there also seems to be a greater understanding of the importance of improved supply chain systems to coordinate the efforts of many decentralized organizations,” Heier Stamm concluded. “Success in humanitarian relief efforts is not only measured in lives saved but also quality of life for survivors. As a result of my research, I hope approaches are developed and adopted within the international relief community which improve disaster response efforts and minimize the short- and long-term human toll of disasters.”

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